

to field capacity to the depth of the 1 m root zone before planting. The critical, moisture-sensitive growth stages are flowering and early pod set which occur at 40 to 50% and 50 to 60% of the growing season.

Weed control

Efficient weed control is a prerequisite for high dry bean yields. Dry beans compete poorly with weeds as they are low growing plants and do not easily overshadow weeds. Early control is extremely important because the root system of the plant develops at this stage and some weeds secrete chemical substances which limit plant growth. At a later stage weeds hamper the harvesting and threshing processes and adversely affect the quality of the crop.

Soil requirements

Dry beans have to be planted in warm soil (minimum temperatures preferably above 13°C) after all danger of frost has passed. They perform best on fertile sandy loam to loam soils with good internal or tile drainage and moderate organic matter content. Soils with a pH from 5, 8 to 6,5 are the best.

Pest and disease control

Diseases and pests may have been partially responsible for the unstable production that has been experienced in the past. Incidence and severity vary between seasons due to environmental and management practices. Integrated disease and pest management, using all suitable control measurements, is recommended.

Harvesting

Dry beans have a moisture content of 50% at physiological maturity. The beans however, are only ready for harvesting when the moisture content drops to 16%, the ideal being 15%. Seeds may split during threshing when the moisture content is less than 12% and such seeds are rejected by canners and seed companies and is difficult to clean without

further seed split or broken seed coats occurring. Dry beans should be harvested when all the pods have turned yellow, but before they have become so dry that the pods begin to shatter.

Importance and uses

Human uses: Dry beans are used in soups, chili dishes, baked beans, casserole recipes, refried bean paste, fresh salads, and can be purchased in dried or previously canned and cooked products. Dry beans are also regarded as suitable protein supplements for lower income societies.

Livestock feed: Beans which do not meet human food quality standards can be utilised for feeding livestock.

Other uses

It can be used for soil improvement because of its nitrogen fixation ability and also as green manure, increasing organic matter in the soil thus is best to use it in a crop rotation cycle.

ACKNOWLEDGEMENT

ARC-Grain Crops Institute: Potchefstroom

Further information can be obtained from

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Dry beans



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Department:
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REPUBLIC OF SOUTH AFRICA

Scientific name: *Phaseolus vulgaris*

Common name: Small white beans, red speckled, sugar beans, brown and yellow haricot

BACKGROUND

Dry beans (*Phaseolus* spp.) originated in Central and South America. Today field beans are the most widely cultivated species of *Phaseolus* and, in terms of tons of crop produced per year, they are the second most important legume in the world (soya-beans are first).

Production areas

Province

	<i>District</i>
Mpumalanga	Gert Sibande
Free State	Thabo Mofutsanyane
North West	Ngaka Modiri Malema, Dr Kenneth Kaunda, Bojanala
Gauteng	Ekurhuleni, Sedibeng, West Rand
KwaZulu- Natal	uMgungundlovu, UGu, Ezinqoleni

AGRONOMIC REQUIREMENTS

Soil requirements

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Climatic requirements

Dry beans are annual crops which thrive in a warm climate. They grow optimally at temperatures of 18 to 24 °C. The maximum temperature during flowering should not exceed

30 °C. Day temperatures below 20 °C will delay maturity and cause empty mature pods to develop.

Rainfall requirements

Under irrigation, dry beans require 400 to 500 mm of rain during the growing season, however an annual rainfall total of 600 to 650 mm is considered ideal

Cultivars

The National Dry Bean Cultivar Trials are conducted by the Agricultural Research Council - Grain Crops Institute (ARC-GCI) annually. The information is published by the Dry bean Producers Organisation (DPO) in SA. Dry beans are classified into types according to:

Colour and seed size

Small white beans (15 to 25 g 100 seeds-1), used mainly for canning purposes; 10 to 20% of local production.

1. Red speckled or speckled sugar beans (red speckles on a beige background) (40 to 55 g 100 seeds-1); 65 to 75% of local production
2. Large white kidney beans (80 to 100 g 100 seeds-1); 5 to 10% of local production.
3. Carioca beans (khaki stripes on a beige background) 20 to 25 g 100 seeds); 3 to 5% of local production.
4. Alubia beans (large white) (45 to 55 g 100 seeds-1); 1 to 5% of local production.

Growth habit

Type I: Determinate growth habit. They have a long stem and flowers on tips of branches.

Type II: Indeterminate growth habit, with few short and pendicular growing side-branches, grows after flowering.

Type III: Indeterminate growth habit, have very long and flat running side-branches.

Growing season

Temperatures, especially during the night, determine the length of the growing season of a cultivar. Short (85-94 days); medium (95-104 days); long (105-115 days).

Cultural practices

Propagation

Dry beans are propagated by seeds

Soil preparation

The seedbed must be deep, level and firm as this ensures better surface contact between the seed and the soil, increasing the absorption of moisture. A levelled seedbed also facilitates planting to a uniform depth.

Fertilisation

It is recommended that beans be planted on soils which have been previously well fertilised. General fertility is more advantageous than direct fertilisations, as beans are sensitive to high concentrations of mineral salts.

Planting

Planting dates are mainly restricted by the possible occurrence of frost (planting too late) and rain at harvesting which results in poor quality (planting too early). Planting dates in South Africa range from November to mid-January in areas where frost occurs. In frost-free areas, March and April are the best months for planting beans. The large white kidney bean (*P. coccineus*) is an exception and is planted from mid-November to mid-December and is not adapted to winter production. The seeds are placed at 2, 5 to 7 cm below the surface.

Irrigation

Sprinkler irrigation is the most common means of irrigation for dry beans. In areas where water is unrestricted (not merely supplementary irrigation), the soil should be wet